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THE UNIVERSITY OF TORONTO MEDICAL JOURNAL

(An Undergraduate Publication)

This journal is published seven times a year, November to May, by the Medical Society of the University of Toronto, to serve as a medium for student expression and to bring to the student recent articles of scientific interest.

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With advisers from the Staff of the Faculty of Medicine.

Address all communications to Room 107, Medical Building.

Volume IX TORONTO, DECEMBER, 1931 Number 2

EDITORIAL

INTERNSHIPS.

The question of internship looms before every medical student, but most especially before the student in the final year. It is generally accepted, that at least one year of internship is highly desirable following graduation. The more important decision to be made is not, "Shall I take an internship?" but "Where shall I take an internship?" We believe that a great many students graduating from a Canadian University prefer to remain in Canada, but through ignorance of the available suitable hospitals have not been able to do so. With a view to assisting the members of the final years, we are publishing elsewhere in this number a partial list of so-called "Approved Hospitals." Further explanation will be found accompanying this list.

MEDICAL DISCUSSION.

Sir William Osler once sagely said that "physicians need friction." It was not a theoretical chance remark,—it was born of much observation and study. He saw, as others have seen, the tendency for the medical practitioner to develop rigid ideas and to become "hidebound"—his mistakes forgotten and his successes glorified. There is always just such a danger when one man alone tries to elaborate his own diagnosis and treatment. He is apt to forget that the "vis naturae" is towards healing, and that spontane-

ous cures have been recorded. On the other hand, people are dying in spite of treatment expected to cure—the patient may not follow advice, or some unpredicted and unseen factor may be present.

Doctors in the vanguard of the Profession have grasped Osler's principle and have made it their own. It is more than the urge for sociability that brings them tobether in groups, societies and conventions. They meet for earnest discussion, the presentation of case reports, and a compilation of statistics. It is to-day comparatively easy for practitioners to keep abreast of the times. All Hospitals have regular staff meetings, where reports, original papers, and reviews are presented. Membership in the Canadian Medical Association includes an excellent Journal, issued monthly. Reference libraries and the best periodicals are becoming more and more extensively available.

The principle holds as well for undergraduates. The curriculum calls for clinics and groups—there is still room for serious discussion, formal and otherwise. The undergraduate clubs, that have come to our notice, which have been formed for this purpose, have been eminently successful; the "17 Club" organized over 10 years ago, the Hippocratic Club begun in last year's 5th year, and the Alpha Omega Alpha Honourary Medical Fraternity.

If the leaders of the profession are so definite in their belief in the "friction" of journals, groups and discussion, it must hold that the sooner the undergraduates follow, the better.

MALARIA.

While we believe that an undergraduate medical student should concern himself primarily in mastering the fundamental principles of medicine, we nevertheless think that it is very interesting and certainly does no harm to occasionally acquaint oneself with recent developments in the science of medicine. It is with this in mind that we shall print from time to time short comments upon interesting recent advances which come to our attention.

A recent development in the conquest of malaria was announced in the Lancet of August 15th, 1931, by James, Nicol and Shute. A substance known as Beprochin or Plasmoquine was used as a prophylactic for malaria. Anophelene mosquitoes were infected by feeding upon a case of tertian malaria. To ten volunteers were given 0.02 gms. of plasmoquine three times a day; after the second dose they were subjected to bites from the mosquitoes which were proven to contain and secrete in their saliva living malarial sporazoites. None of these individuals contracted malaria. Controls were carried out upon patients who were taking malarial treatment for mental disease. Quinine showed no prophylactic action. There appears, therefore, to have been developed a substance which possesses a more valuable property than quinine, namely, that it will prevent the contraction of malaria even if the individual is bitten by infected mosquitoes. If this preliminary work is borne out by subsequent developments, there would appear to be hope for the lessening of the ravages of malaria in the tropics.

IN THIS ISSUE.

Even were Sir William Osler's textbook, "The Principles and Practice of Medicine," not officially prescribed at this University (which could hardly happen), students and medical men would still buy it and read it. The volume is a work of literature, and no one reading it can miss the close relation between art and science exemplified in Medicine. The glimpse of the author afforded by Dr. McDermot's article will send many to read the more complete story of the Canadian who became the Greatest Physician.

Osler's Textbook of Medicine.*

By H. E. MacDERMOT, M.D., F.R.C.P. (Can.).

No one is ever likely to turn to medical textbooks for light reading, least of all a layman. They are a type of literature with a very natural austerity, if not aridity, but investigation will show that these forbidding qualities are not always present in equal degree. For any layman inclined to explore, Sir William Osler's "Principles and Practice of Medicine" is without doubt the best textbook on which to begin—and probably to end! I am not referring to its excellence as a source of medical knowledge, for there are other textbooks just as authoritative and comprehensive. But there is no other in which one will find a greater wealth of historical and literary allusion, a more varied selection of the unusual and impressive; or a style with greater freshness, vigour, and lucidity. Osler has left us an account of how the book came to be written:

> On several occasions, in Philadelphia, I was asked by Lea Bros. to prepare a work on diagnosis, and had half promised one; indeed, I had prepared a couple of chapters, but continually procrastinated on the plea that up to the 40th year a man was fit for better things than textbooks. Time went on, and as I crossed this date I began to feel that the energy and persistence necessary for the task were lacking. In September, 1890, I returned from a four months' trip in Europe, shook myself, and towards the end of the month began a work on Practice. I had nearly finished the chapter on Typhoid Fever, when Dr. Granger, Messrs. Appleton's agent, came from New York to ask me to prepare a textbook on Medicine. We haggled for a few weeks about terms, and, finally, selling my brains to the Devil, I signed the contract. My intention had been to publish the work and have Lippincott or Blakiston (both of whom offered) handle the book, but the bait of a guaranteed circulation of 10,000 copies in two years and fifteen hundred dollars on the date of publication was too glittering, and I was hooked.

Then he gives the details of his daily task.

> Three mornings of each week I stayed at home and dictated from 8 a.m. till 1 p.m. On the alternate days I dictated after the morning hospital visit, beginning about 11.30. The spare hours of the afternoons were devoted to correction and reference work. . . . After 5 p.m. I saw any outside cases, dined at the Club about 6.30, loafed until 9.30, bed at 10, up at 7 a.m.

All this and more is pencilled on the flyleaf of his own specially bound copy of the first edition (1892). It is this copy which bears the inscription: "Private Copy. May all the curses of the good Bishop Ernulphus light on the borrower-and-not-returner or upon the stealer of this book."

The heavy part of the work was done in the summer months, and in Baltimore, too, and the snapshots which accompany Osler's notes show him at his desk, in his shirtsleeves, which, as Dr. H. A. Lafleur has remarked in his reminiscences of Sir William, will be immediately understood by anyone who has spent a summer in Baltimore. Dr. Hunter Robb, who lent Osler his sitting room to work in, has told us how "oftentimes right in the middle of his dictating he would stop and rush into my other room, and ask me to match quarters with him, or we would engage in an exchange of yarns. It was a great treat for me, and except when he would court inspiration by kicking my wastepaper basket about the room, I thoroughly enjoyed his visits." The unfortunate receptacle he eventually left in peace, but only after it had been carefully weighted with concealed bricks.

But in spite of the heat Osler concludes:

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*Reprinted by permission of The McGill News and the author.

> During the writing of the work I lost only one afternoon through transient indisposition and never a night's rest. Between September, 1890, and January, 1892, I gained nearly 8 lbs. in weight.

The book has undergone a great many changes since the first edition, as all good textbooks must. This has meant much careful selection and pruning to prevent its becoming unwieldy, and so one occasionally finds in the earlier editions matter which one would have liked to see retained. For example in speaking of the spread of tuberculosis, he shows how apt this is to take place between husband and wife. "Webber's cases," he says, "are of special interest. One of his patients lost four wives in succession, one lost three, and four lost two each." But these modern Bluebeards are not mentioned after the sixth edition. The 7th edition, too, is the last to include the comment: "From the days of Mephibosheth, infantile paralysis has been attributed to the carelessness of nurses in letting the children fall."

It was seldom, however, that he took out the classical or biblical allusions. His simile between the development of tuberculosis and the parable of the Sower is retained in the latest edition, although in the 8th edition he speaks of it as "somewhat hackneyed".

> The ultimate result in a given case depends upon the capabilities of the body to restrict and limit the growth of the bacilli. There are tissue-soils in which the bacilli are, in all probability, killed at once — *the seed has fallen by the wayside.* There are others in which a lodgment is gained and more or less damage done, but finally the day is with the conservative protecting forces—*the seed has fallen upon stony ground.* Thirdly, there are tissue-soils in which the bacilli grows luxuriantly . . . and the day is with the invaders—*the seed has fallen upon good ground.*

In almost every edition the number of such allusions is added to. In second edition, for example, he refers to the cure of hiccough recommended by Plato:

> Readers of Plato's Symposium will remember that the physician Eryximachus recommended to Aristophanes, who had hiccough from eating too much, either to hold his breath (which for trivial forms of hiccough is very satisfactory), or to gargle with a little water; but if it still continued, 'tickle your nose with something and sneeze, and if you sneeze once or twice even the most violent hiccough is sure to go.' The attack must have been of some severity, as it is stated subsequently that the hiccough did not disappear until Aristophanes had resorted to the sneezing.

Also, in his chapter on gout, he says:

> A common gouty manifestation upon which Duckworth has laid stress, is the occurrence of hot or itching feet at night. I notice in Plutarch that Strabo called this symptom "the lisping of the gout."

In the 8th edition, referring to smallpox, he writes:

> For centuries attempts have been made to modify the course of the pustules (of smallpox) by either excluding the light or modifying its character. In the Middle Ages, John of Gaddesden recommended wrapping the patient in red flannel, and treated in this way the son of Edward I. It was an old practice of the Egyptians and Arabians to cover the exposed parts of smallpox patients with gold leaf.
>
> For centuries it had been a popular belief among farmer folk that cowpox protected against smallpox. The notorious Duchess of Cleveland, replying to some joker, who suggested that she would lose her occupation if she was disfigured with smallpox, said she was not afraid of the disease, as she had a disease that protected her against smallpox . . . When Jenner was a student, a young girl who came for advice, when small-pox was mentioned, exclaimed, "I cannot take that disease, for I have had cowpox." Jenner subsequently mentioned the subject to Hunter, who in reply gave the famous advice: "Do not think, but try; be patient, be accurate."

Speaking of the treatment of coughing up of blood he says:

> Rest of the body and peace of mind —"quies, securitas, silentium" of Aretaeus—should be secured . . . As Aretaeus remarks, in haemoptysis (blood

> spitting) the patient despairs from the first, and needs to be strongly reassured.

The latter sentence, however, was rather different to what he first thought of putting in, as shown by his pencilled note in the working copy of the third edition, which reads: "Aretaeus says that in haemoptysis the patient despairs from the first, but in consumption he flatters himself with hope of recovery to the last." To the modern medical man haemoptysis and consumption usually go together, while Aretaeus obviously drew a distinction between them; but the dying consumptive flattering himself with hope of recovery, is still to be seen in any tuberculosis clinic.

Tuberculosis was a "pet" subject with Osler—as much as that title of endearment can be applied to anything so grim: it was "Captain of the Men of Death, as Bunyan calls it." He made great play with this when he attended the British Congress on Tuberculosis as representative from America:

> "The captain," he said, "had nevertheless been reduced to a lieutenant and would soon be reduced to the ranks, although it was almost too much to expect that he would be actually drummed completely out of the regiment."

Osler's writings inevitably remind one of Macaulay's, with their stream of allusion to classical and historical literature. One young doctor wrote Osler in despair because of the many allusions in "Aequanimitas" which he could not understand—and received a full reply to all his questions. These allusions provided a feature which inevitably was made fun of, and in due time an "examination paper" on the textbook appeared, in which Osler himself admitted that he would not have made full marks. All the questions were on points dealt with in the book (the 4th edition), and their answers called for a very intimate acquaintance with it. One question was: "What internal evidence is there that Osler had had an unhappy experience with cheap bicycles?" It was this query that Osler could not answer; but it was pointed out to him that the answer lay in a remark he made about the diseases of arteries, a tendency to which in some families could only be explained by the fact that "in the make-up of the machine bad material was used for the tubing."

Those who, through intimate acquaintance, might have passed the examination, will probably remember two passages in particular in which Osler's warmth of feeling was allowed full expression, although there are others not far behind them. In the first of these, he is dealing with the question of protective measures against venereal disease. After pointing out that the State has accepted responsibility for guarding citizens against smallpox or cholera, he goes on to say:

> The choice lies between two evils—licensing, even imperfectly carried out, or widespread disease and misery. If the offender bore the cross alone, I would say, forbear; but the physician behind the scenes knows that in countless instances syphilis had wrought havoc among innocent mothers and helpless infants, often entailing life-long suffering. It is for them he advocates protective measures.

This passage, however, is found only in the first three editions. The second passage is a condemnation of the work of one Sanarelli in connection with yellow fever. He says:

> The work of Sanarelli has been marred by a series of unjustifiable experiments upon men, which should receive the unqualified condemnation of the profession. In one sense, every dose of medicine given is an experiment, since who can tell the nature of the reaction? But the limitation of deliberate experimentation on human beings should be clearly defined. Voluntarily, if with full knowledge, a fellow-creature may submit to certain tests and trials, just as a physician may experiment upon himself. Drugs, the value of which has been carefully tested on animals (if found harmless) may be tried on patients, since alone in this way can progress be made. But deliberate experiments such as Sanarelli carried out with cultures of known and tested virulence, and which were followed by seri-

ous, nearly fatal, illness, are simply criminal.

By the time the next edition came out, however, it had been found that Sanarelli's work was inaccurate, and no further notice was taken of it.

Some of Osler's additions and recasting of sentences are worth noting. He devotes a chapter to obesity, for example, which at first he speaks of merely as "An excessive development of bodily fat." In the 3rd edition, this is enriched by the qualification—" 'an oily dropsy,' as Byron termed it." In the next edition, he adds the comment: "An extraordinary phenomenon seen occasionally in excessively fat young persons is an uncontrollable tendency to sleep." And then, in the 6th edition, like the final triumphant chord in a fugue, he completes it with, "like the fat boy in Pickwick."

Again, under whooping-cough, he alters the sentence: "Children are usually terrified at the onset and run at once to the mother or nurse to be supported during the attack," to "The child knows for a few moments when the attack is coming on and tries in every way to check it, but failing to do so, runs terrified to its mother or nurse to be supported, or clutches anything nearby."

Further on, in the same chapter, he wrote the following note in the working copy of the 5th edition, the words here shown in italics being first written in and then struck out:

> We may say to-day with Willis, that "it rather cures by change of the season than is extinguished by remedies." Old women and empirics, he remarks, are as often consulted as physicians. *The truth is, the only sure remedy is six or eight weeks*, and there is no disease which illustrates more painfully the futility of our therapeutic efforts. Six or eight weeks, a big bottle of paregoric, and a watchful nurse or mother, are the essentials.

As often happened, however, he did not use this, and what actually appeared in the 6th edition was: "If asked the two most important things I should say, six weeks and a good big bottle of paregoric," and even this was taken out in the 9th edition.

On the subject of appendicitis, his notes for the 2nd edition read: "Through the pernicious influence of the daily press appendicitis has become a fad, and it has become an important duty of the physician to stand between the patient and the knife."

But in later editions he modifies this to read: "The physician has often to deal with patients who have a sort of fixed idea that they have a disease." In case the impression should be gained from this that he was criticizing the surgeons, it should be added that he puts in the remark: "The general practitioner does well to remember, whether his leanings be toward the conservative or the radical methods of treatment, that the surgeon is often called too late, never too early."

In the chapter dealing with mental disorders he had up to the 8th edition a section on "Faith Healing," which he then altered to "Psychotherapy," in accordance with modern usage. The opening paragraph of this reads:

> Hypnotism is rarely indicated. Carefully practised suggestion is most helpful and the psycho-analytic method of Freud may be tried. The use of religious ideas and practices may be most helpful, and this has come into vogue in various forms, as Christian Science, Emmanuelism, Mental Healing, etc. It is an old story.

And then comes the sonorous, almost liturgical passage which he had at first and which has been preserved in every edition:

> In all ages, in all lands, the prayer of faith, to use the words of St. James, has healed the sick; and we must remember that among the Aesculapian cult, the most elaborate and beautiful system of faith healing the world has ever seen, scientific medicine took its rise. As a profession, consciously or unconsciously, more often the latter, faith has one of our most valuable assets, and Galen expressed a great truth when he said, "He cures most successfully in whom the people have greatest confidence." It is in these cases of neurasthenia and psychasthenia, the weak

brothers and the weak sisters, that the personal character of the physician comes into play, and once let him gain the confidence of the patient, he can work just the same sort of miracles as Our Lady of Lourdes or Ste. Anne de Beaupré. These elements are necessary: First, a strong personality, in whom the individual has faith—Christ, Buddha, Aesculapius (in the days of Greece), one of the saints, or, what has served the turn of common humanity very well, a physician. Secondly, certain accessories—a shrine, a sanctuary, the services of a temple, or for us a hospital or its equivalent, with a skillful nurse. Thirdly, suggestion, either of the "only believe," "feel it," "will it" attitude of mind, which is the essence of every cult and creed, or the active belief in the assurance of the physician that the precious boon of health is within reach.

There was one unexpected repercussion from the textbook which is to be found in a clipping from an osteopathic journal of the day, preserved in Sir William's own copy of the third edition. The writer has seized on the point that the book does not advocate the use of drugs to the extent then customary, and jubilantly begins:

> The Osteopathist believes that the internal administration of drugs is useless . . . It is therefore with very great pleasure that he finds his heavy contention (sic) . . . supported by one of the best and most recent of the regular, orthodox, allopathic medical books. Osler deprecates the drugging propensities of the profession, and has reached the great success attained by him upon hydrotherapy, hygienic surroundings, etc.
>
> How much better he might have done under Osteopathic practice, he, perhaps, will never know.

Sir William must have had a good deal of fun out of his book in one way and another, but few things can have seemed more deliciously naive than that last sentence.

No single book in modern medicine has had a wider influence on medical thought and endeavour. There was one specially noteworthy influence with which it is credited, and that was its helping to bring into existence the Rockefeller Institute of Medical Research. In the summer of 1897, a copy of the book came into the hands of Mr. F. T. Gates, a member of Mr. J. D. Rockefeller's philanthropic staff, and he was so attracted by it that, with the aid of a medical dictionary, he read it from cover to cover. "Having once started, I found a hook in my nose that pulled me from page to page."

In the psychological jargon of today, he had "a reaction" to the book:

> I saw clearly from the work of this thoroughly enlightened, able and honest man, perhaps the foremost practitioner in the world, that medicine had (with a few exceptions) no cures, and that about all that medicine up to 1897 could do was to suggest some measure of relief, how to nurse the sick, and to alleviate in some degree the suffering . . . I made a list—and it was a very long one at that, much longer than it is now — of the germs which we might reasonably hope to recover but which as yet had never been, with certainty, identified; and I made a longer list of the infectious or contagious diseases for which there had been as yet no cure at all discovered.
>
> When I laid down this book I began to realize how woefully neglected in all civilized countries, and perhaps most of all in this country, hed been the study of scientific medicine. . . It became clear to me that medicine could hardly hope to become a science until it should be endowed, and qualified men could give themselves to uninterrupted study and investigation, on ample salary, entirely independent of practice . . .
>
> Here was an opportunity for Mr. Rockefeller to become a pioneer . . . I knew nothing of the cost of research; I did not realize its enormous difficulty; the only thing I saw was the overwhelming and universal need and the universal promise, world-wide, universal, eternal.

And then he tells how he took his copy of Osler's book to his office and dictated a memorandum for Mr. Rockefeller, in which he tried to show the actual conditon of medicine in the United States and the world as disclosed in the book:

> I enumerated the infectious diseases and pointed out how few of the germs had yet been discovered and how great the field of discovery; how few speci-

fics had yet been found and how appalling was the unremedied suffering. . . . I pointed out the fact, first stated by Huxley, I think, that the results in dollars or francs of Pasteur's discoveries about anthrax and on the diseases of fermentation and of the silkworm had saved for the French nation a sum far in excess of the entire cost of the Franco-German war . . . even if the proposed institute should fail to discover anything, the mere fact that he, Mr. Rockefeller, had established such an institute of research would result in other institutes of a similar kind . . . and that out of the multitudes of workers we might be sure in the end of abundant rewards . . .

These considerations took root in the mind of Mr. Rockefeller and, later, of his son. Eminent physicians were consulted as to the feasibility of the project, and out of the wide consultation the Rockefeller Institute of Medical Research came into being.

To Mr. Gates, then, we must give very high marks for his study of the textbook, even though he was thinking mostly about what it did *not* contain! It stimulated him to great visions of what preventive medicine could do (visions which fortunately were shared by Mr. Rockefeller), because it was the writing of a man who not only was an enthusiastic master of his subject, but was able to transmute its ordinary cold and repellent aspect into one of warmth and lively interest.

The Induction of Labour—Methods and Indications.

By G. LESLIE WATT, M.B.
Department of Obstetrics, University of Toronto.

The first published account of the induction of labour, one of the oldest therapeutic procedures in obstetrics, was in 1609, when Louise Bourgeois claimed it for herself. She first put it into practice in the year 1602. Whereas Guilleman in his "L'Heureux Accouchement," which was published shortly after her book, states that he delivered the daughter of Ambroise Paré by inducing labour in the manner which he had seen practiced by Paré twenty-five years before.

This has been pretty well established and F. R. Packard, in his "Life and Times of Ambroise Paré," points out: "Malgaigne has proved conclusively that the credit of this innovation in obstetric practice should be ascribed to Paré."

At a conference in London in 1756, to discuss the frightful mortality in Caesarean section, Denman suggested the introduction of premature labour by rupture of the membranes, and MaCauly of London first did it in England.

In 1855 Krause introduced the bougie method, and it was in 1888 that Champetier de Ribes invented his bag, which required some dilatation of the cervix.

Prior to 1913, when Doctor B. P. Watson, formerly Professor of Obstetrics and Gynaecology at the University of Toronto, published his original paper, there had been accounts of attempted induction by castor oil and quinine or pituitrin or both, but in 1920, on his return from the war, he published a series of 62 cases with 53 successes by the method that now goes by his name and which is in general use at present. Since that time there has been much written on this subject.

The question of the value of induction of labour is still disputed by some, but it is generally accepted by the great majority of obstetricians as a very valuable procedure if certain definite indications are borne in mind and the method suited to each individual case. It should also be remembered that the induction of labour does not necessarily mean the induction of premature labour, for it may be practiced at term

or after term just as well as before.

At the present time we have several methods of inducing labour, and that used in each case is chosen because of special indications which arise in the individual cases themselves.

Medical Induction.

Medical induction, because of its simplicity and the fact that it calls for no surgical interference, has by far the widest field. The method as laid down by Professor Watson is still in use at the Burnside Hospital, and has been found most satisfactory. The technique is as follows. Starting at 6 a.m., the patient is given castor oil, one ounce; at 7 a.m., a simple enema, and at 8 a.m., 10 a.m., 12 a.m., ten grains of Quinine Hydrochloride; at 2 p.m. one quarter c.c. of pituitrin is given intramuscularly; at 2.30 p.m. one half c.c. followed by one half c.c. at half hour intervals until six doses have been given. Instructions should be left that should pains begin, all medication is to cease, and the obstetrician should be present when the first dose or two of pituitrin is given to observe the effect on the uterus, for occasionally a severe tonic contraction occurs which can only be stopped by anaesthetic, and no further pituitrin should be given. If there is no result from this, another medical induction may be tried after the patient has had a complete rest of 24 to 48 hours.

Failure of medical induction with a definite indication for emptying the uterus leaves one the opportunity of trying a mechanical induction by one of the following procedures.

Induction by means of bougies.

In all mechanical methods of inducing labour the strictest surgical asepsis must be observed. It should never be attempted outside a modern operating room, and the patient should be anaesthetized, draped and prepared as for a vaginal operation. The cervix is then grasped with a sponge forceps and dilated, using Hegar's dilators, to a No. 10 or No. 12. The bougies are then inserted between the uterine wall and the membranes, taking care not to rupture them, and should be withdrawn if any obstruction is met with, or any undue haemorrhage occurs. Ordinarily they slip in very easily, and if any difficulty is experienced they should not be forced, as they may be coming in contact with the placental site. They should be withdrawn and inserted in another direction. Three bougies are usually used if one can get them in without difficulty, if not two are sufficient. They are inserted as far as possible and held in place by packing the vagina lightly with iodoform gauze. A perineal binder is then applied over a pad and the patient returned to bed. As a rule pains will begin in about twenty-four hours, being stimulated by the irritation of a foreign body on the uterine wall.

The objection to this method is that it sometimes takes a long time to work. However, they may safely be left in four or five days, and should not be withdrawn to be reinserted. When labour begins they should not be removed until they are pushed out with the packing.

Induction with a bag.

There are two types of hydrostatic bag in common use, the Voorhees and the De Ribes. The Voorhees is the bag which is used at this clinic. It is a conical bag made of rubberized cloth, the diameter of the largest part being approximately that of a foetal head. The patient is prepared as usual and the cervix dilated with Hegar's dilators large enough to admit the bag, empty and folded. This dilatation in a primipara should be done very slowly and carefully so as not to tear the cervix. In some cases it can not be done without injury, and here it is much better to induce by means of bougies than to force the dilatation. The bag is introduced folded as small as possible, with the base of the cone toward the cavity of the uterus. There is a special instrument for inserting the bag, but an

ordinary sponge forceps will be found quite satisfactory. The bag is held in place and filled with a sterile solution by means of a syringe, the tube leading from the bag securely tied. The patient is returned to bed, and a weight is applied by means of a tape over the end of the bed, just sufficient to keep tension on the bag. The pressure on the lower uterine segment, together with the dilatation, starts labour pains as a rule within twelve hours. This is perhaps a more reliable method than bougies, but has the disadvantage of requiring greater dilatation of the cervix and displacing the foetal head with the resultant danger of a prolapsed cord.

Probably the most satisfactory mechanical method of induction is the combination of the two. The bag is put in and the bougies introduced past it as described, the bag when inflated holding them in place. This gives the added stimulation to the uterine wall and probably has the least number of failures. Of course in either of these methods, the bag is not removed until pushed into the vagina, and by that time the cervix is entirely out of the way and the second stage of labour has begun.

There is a fourth method of mechanical induction which is mentioned only to be condemned. That is packing the cervix with gauze. This method is ineffective and apt to introduce infection due to removing the packing and repacking, which as a rule takes place all too frequently. The percentage of successes with this method is exceedingly small, and our feeling is that it should never be used.

Indications.

These are the methods at our disposal, and the indications for their use will now be discussed. There are five common indications for the induction of labour, medical diseases such as: tuberculosis, chronic nephritis and heart disease, some cases of toxaemia, placenta praevia, certain cases of contracted pelvis, and post maturity with the possibility of relative disproportion.

The medical indications for the induction of labour may be dismissed without discussion, as they are primarily medical problems and the obstetrician acts only after consultation with a qualified medical consultant. Some of the conditions for which this is done are chronic nephritis, heart disease and tuberculosis. As a rule the treatment is in the nature of a therapeutic abortion, but may come under the induction of premature labour if termination of the pregnancy is decided on in the later months, when some form of mechanical induction will be performed.

Falling under the heading of toxaemias are those cases of pre-eclampsia in which the obstetrician feels that in spite of treatment the patient is headed for convulsions and the pregnancy must be terminated. Having decided this, there are two methods open to him. If it is safe to temporize, a medical induction should be tried if the patient has passed eight months. Prior to this time I do not believe the hope of success is great enough to warrant giving it a try. If the medical induction fails or if it is earlier than eight months bougies and a bag are the best method to employ.

One of the greatest uses of induction is in the treatment of the marginal and lateral types of placenta praevia. The course pursued will depend on whether the patient is in labour or not, and whether the cervix is dilated if labour has commenced. In those cases where the patient is not in labour and conservative treatment is decided on, rather than Caesarean section, rupture of the membranes and the repeated intermuscular injection of one half c.c. of pituitrin will induce labour and bring the presenting part against the placental site, thus controlling the bleeding. This is a most useful procedure, and is often sufficient to control the situation.

In cases where the patient is in labour and the cervix is partially dilated, if rupture of the membranes does not bring down the presenting part sufficiently to control the bleeding, a

bag may be introduced to bring added pressure on the placenta and to stimulate contraction. This again will control the bleeding until the cervix is out of the way and either the presenting part comes down or a version may be done.

When discussing the question of the induction of labour in cases of contracted pelvis, controversial ground is reached. Some writers advocate the use of induction of premature labour in all border line pelves, or rather in all cases that are not frankly impossible. Others advocate allowing all patients to go to term and giving them the test of labour, at which time a Caeserean section may be done if labour does not progress satisfactorily.

In our opinion a middle course should be pursued. The patients with moderately contracted pelves should be watched carefully during the last month and a medical induction may be tried any time after the eighth month if the obstetrician feels that the baby is too large for that particular pelvis. If the induction succeeds, all well and good; if not it may be repeated later. Labour induced in this way still leaves the opportunity for Caesarean section, should it become obstructed. This is as far as one should go.

Generally speaking, mechanical induction should never be resorted to for contracted pelvis or disproportion, as it precludes any possibility of delivering the patient by means of Caesarean section with any safety, should the labour become obstructed. The usefulness of medical induction is admitted in cases of contracted pelvis after the eighth month, and it will be successful in a large number of cases, enabling the obstetrician to deliver from below a baby which if allowed to go to term would give him great difficulty; but mechanical induction should never be done in these cases.

A good deal of what has been said regarding contracted pelvis may be said of cases of post maturity, for the only problem that post maturity presents is the question of a relative disproportion.

In cases of post maturity one should be very conservative. In the first place, there is real difficulty in being sure that a patient is overdue, as it is exceedingly easy for her to make a mistake regarding her last menstrual period. Many women are careless in keeping track, and a discrepancy here will throw the obstetrician out. However, having definitely established post maturity, the problem is whether or not this particular head will go through this particular pelvis, and there is only one way to find out, that being to give it a trial. Now in order to accomplish this a medical induction may be resorted to, but is an unnecessary procedure. Labours begun by medical induction in these cases are often slow and unsatisfactory. The pains are irregular and not very strong. Hence the first stage is prolonged, and if the head does not advance one is not quite sure whether

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the fault is with the forces or a disproportion really exists. It it better to let cases of post maturity alone, allowing them to go into labour themselves, giving them an honest test, and if an obstruction is present a section may be done.

Here again the only form of induction that is permissible at all is medical, and it is better to use none at all.

The field for medical induction is much greater, and one can never do very much harm by trying it where there is an indication for induction at all. The advent of the low Caesarean section, with its lowered mortality and increased usefulness, has done away with any question of mechanical induction in cases where a disproportion is believed to be present, for it is safer to allow a patient to go into labour herself. If she delivers herself with or without help from below she did not require an induction, and if labour becomes obstructed, a Caesarean can still be done, whereas if a mechanical induction has been done, one is forced to deliver by the vaginal route regardless of the difficulty and its attendant dangers to mother and child.

In conclusion, then, the whole question of the induction of labour resolves itself into being careful not to burn one's bridges behind one and rush into a mechanical induction where there is a possibility that one cannot deliver from below, and a word of warning or rather of caution should be added, for no induction of labour is without a certain risk to mother or child, or both. Even medical induction, it should be remembered, is looked upon with disfavour by some eminent obstetricians, and with a mechanical induction there is always the danger of infection. It is true these dangers are not very great, but nevertheless they exist, and are sufficient to demand justification for any steps taken to bring on labour before its natural onset.

The Thyreoid Gland.

By F. S. BRIEN, B.A., '33.

Embryology.

The thyreoid gland arises from the floor of the mandibular arch exactly in the mid-line. The endoderm of the retro-mandibular furrows gives rise to a saccular diverticulum almost as soon as the fore-gut becomes differentiated —early in the fourth week of development. Immediately in front of the thyreoid evagination arises the buccal part of the tongue; behind it arises the pharyngeal part, the foramen caecum in the sulcis terminalis remaining to mark the site of origin. The endodermal vesicle so formed grows downwards and backwards through the tissue in which the body of the hyoid bone will be formed, and bifurcates as it extends along this course. The stalk of the evagination is at first hollow, representing a duct. However, it rapidly becomes solid, breaks up, and by the sixth week has disappeared. The epithelium of the evagination proliferates, and in the seventh week forms a transverse plate ventral to the larynx. This plate is then invaded and broken up into reticulating columns by the surrounding mesoderm. In the third month the epithelial cells become arranged as follicles; these, at a later date, are converted into vesicles. The original plate assumes a bent or horseshoe form, the middle part forming the isthmus, the side parts the lateral lobes.

Anatomy.

The thyreoid gland consists of an isthmus and two lateral lobes. Occasionally a pyramidal lobe is present. In the adult the isthmus covers the second, third and fourth tracheal rings. The

lateral lobes lie under the sternohyoid and sternothyreoid muscles. They rise as high as the oblique line on the sides of the thyreoid cartilages which marks the insertion of the sternothyreoid muscles. The lobes descend to the level of the sixth ring of the trachea. The inferior constrictor of the pharynx lies beneath the gland. The postero-lateral relationship of the thyreoid to the carotid sheath and its contents is most important from the clinical standpoint. If the carotid artery can be palpated anterior to any swelling in the neck, that observation alone definitely excludes the thyreoid as the cause of that swelling. The gland is covered by the pretracheal fascia and possesses a capsule of its own in addition. The parathyreoid bodies are imbedded in the posterior aspect of this covering.

The arteries bringing blood to the thyreoid gland are the superior and inferior thyreoids of both sides. In ten per cent. of cases a fifth artery is present, the thyreoidea ima, which is usually a branch of the innominate. The superior thyreoid arises from the external carotid just above the bifurcation of the common carotid. It rises almost to the greater horn of the hyoid bone, and then descends to the thyreoid supplying the upper portion of the gland, particularly in its anterior aspect, but also sending a branch down its posterior surface. The inferior thyreoid artery, a branch of the thyreoid axis, crosses behind the common carotid artery about the level of the seventh cervical vertebra. It enters the gland from the side and ramifies on its posterior surface, often as a single large trunk beneath the capsule, giving off branches to the gland substance. When present, the thyreoidea ima enters the gland from below, passing up on the trachea.

The veins draining the gland are in three sets, a superior, a middle and an inferior pair, and as Kocher has pointed out, an accessory thyreoid pair between the middle and inferior veins. These ramify under the capsule and form a plexus, which is much enlarged in goitre, and communicates freely across the mid-line in the region of the isthmus. The superior and middle thyreoids drain into the internal jugular veins. The accessory thyreoid veins may drain into the internal jugulars, or may pass downwards as do the inferior thyreoid veins to empty into the innominates.

The minute-volume of blood to the thyreoid exceeds that of any other gland. It has been estimated that all the blood in the body passes through the thyreoid every hour. In proportion to size the vascularity of the thyreoid is rivalled only by that of the adrenal gland.

Williamson and Pearse, in 1930, reported that, as the result of extensive studies, they had come to the conclusion that the lymphatics of the thyreoid were arranged in two distinct systems, one of which drained the capsular region into the cervical glands, and the other, the parenchyma of the gland to the thymus. They also suggested that this so-called thyrothymic system was responsible for detoxification processes and that when its normal working was upset, symptoms of thyreoid intoxication supervened. However, S. D. Gordon of the Department of Surgery, University of Toronto, endeavoured to verify these findings by means of a series of attempts to inject thyreoid lymphatics with India ink. For this purpose he used both living and dead dogs, and made the injections under carefully controlled circumstances.

Subsequent dissections and study of sections were then made. As a result of these experiments he made the following observations:—

1. The capsular and intraglandular lymphatics of the thyreoid communicate freely with one another.
2. The capsular system drains into the superior, inferior and pretracheal lymphnodes.
3. There is no evidence of a second closed system draining into the thymus.

Physiology.

The nerve supply of the thyreoid gland is derived from the middle cervical ganglion of the sympathetic. After stimulation of the cervical sympathetic the active principle of the gland may be demonstrated in the blood leaving the organ. Extirpation experiments, in which care has been taken not to remove the parathyreoids, show that the thyreoid is more important in the actively preying carnivora than in the more placid herbivorous types. In adult sheep some thickening and dryness of the skin, in addition to a tendency to loss of hair and adiposity, are observed if simple thyreoidectomy be performed. In young animals such as lambs or rabbits, changes resembling those in the human cretin are produced by removal of the gland. The skin is dry, thick, and the hair is readily pulled out; retardation of growth occurs; the long bones grow slowly and seldom attain normal size; the muscles are flabby and the teeth poorly developed; the reproductive system remains undeveloped to such an extent that ova and spermatozoa may not mature; nerve cells are shrunken in appearance; dullness and apathy are prominent.

In man, total extirpation of the gland in adults produces cachexia strumipriva or operative myxoedema. Clinically identical is the condition of myxoedema, which occurs spontaneously in adults following atrophy of the gland. There is diminished mental activity; the skin becomes dry and coarse; sexual functions are disturbed, amenorrhoea commonly developing in women; basal metabolism is markedly lower than normal.

In cretinism there is a congenital absence or maldevelopment of the thyreoid gland. However, symptoms do not appear till about the age of six months, which may be due to the presence of adequate amounts of thyreoid substance in the mother's milk. In such a case one observes that the child holds its head up, sits up, walks, learns to talk, etc., much later than normal. Mental development is much retarded; idiocy may be complete. Skeletal growth is stunted. Secondary sex characters do not develop. The skin is thickened; the tongue is enlarged and protrudes from the mouth; fat deposits appear above the clavicles. Constipation usually occurs.

Simple goitre is a condition in which the thyreoid is enlarged and accompanied usually by hypothyreoidism. Marine states that this is due to relative or absolute deficiency of iodine in the food; the result of this is that the gland undergoes a compensatory hypertrophy in order to produce thyroxine under adverse conditions. Absolute iodine deficiency occurs in certain areas where the soil, water or food are deficient in iodine. Relative deficiency occurs in conditions where more iodine is needed by the body, as at puberty and during pregnancy, infections, and under certain diets. One milligramme per day will prevent the development of simple goitre.

Harington analyzed and succeeded in synthesizing the active principle of the thyreoid gland. Kendall was able to isolate thyroxine in a crystalline form. It has the empirical formula $C_{15}\ H_{11}\ O_4\ NI_4$. It is a phenyl ether of tyrosine.

Thyroxine is a very powerful stimulant to bodily metabolism. Every milligramme of thyroxine increases metabolism by an amount equal to the oxidation of 250 gms. of glucose, and thus liberates about 1,000 caleries. From 0.2 to 0.4 milligrammes of thyroxine is destroyed in the body daily.

In normal animals, the administration of small amounts of thyroxine produces diminished rate of growth, disappearance of fat deposits, hypertrophy of organs concerned chiefly with metabolism — liver, kidney and adrenal. Too much thyreoid produces toxic effects, evidenced by loss of weight, gastro-enteritis and diarrhoea, and tachycardia. Exophthalmos has not been produced in this manner.

Graves' Disease (or hyperthyreoidism, or exophthalmic goitre) is due to excessive activity of the thyreoid. The

phrenic nerve has been cut in animals and joined up with the peripheral end of the cervical sympathetic. With each inspiration, impulses passed down the sympathetic to the thyreoid gland. Symptoms of hyperthyroidism developed, and disappeared when the lobe of that side was removed. Some believe that the secretion in exophthalmic goitre is abnormal in character, or that a toxic element is present as well. The symptoms of exophthalmic goitre are increased metabolic rate, sensitization of the sympathetic (dilatation of the pupil, retraction of the upper lid, and exophthalmos), fine tremor of the voluntary muscles, tachycardia. The blood sugar may be raised and glycosuria is frequently seen. Removal of adequate amounts of thyreoid substance usually cures the condition. Before operation it has been observed that the condition of the patient is much improved by the administration of small quantities of iodine in the form of Lugol's solution. This improvement persists, however, for about two weeks only, after which the basal metabolic rate begins to rise again, etc. Plummer believes that in hyperthyreodism a thyroxine poor in iodine is formed and that this is toxic. The administration of iodine results in the formation of normal thyroxine, in excessive amounts. This results in a temporary improvement in the clinical condition of the patient. Marine, on the other hand, is of the opinion that the administration of iodine causes an accumulation of colloid in the acini of the gland. This causes a rise of pressure in the alveoli which interferes temporarily with the passage of the active principle into the blood stream.

From these observations it is evident that thyroxine, the active principle elaborated by the thyreoid gland, acts as a catalyst in the regulation of bodily metabolism. When present in appropriate quantities, development proceeds normally, and metabolism goes on at its usual rate. If too much of the hormone be present the rate of metabolism is increased, as in hyperthyreoidism; if too little be formed, then it is depressed, as in cretinism or myxoedema.

Thyreoid Intoxication.

An attempt will be made in this portion of the article to deal with the problem of thyreoid intoxication from the viewpoint of the surgeon.

One may regard thyreoid intoxication as a dysfunction of the endocrine glands, the sympathetic, the parasympathetic and the somatic nervous systems. In the majority of cases the thyreoid is quite obviously abnormal. However, one finds instances of hyperthyreoidism in which the gland is apparently normal. Thus one is lead to the conclusion that upsets have occurred in the other members of the endocrine system. Menopausal disturbances, sterility, indicate a disordered ovarian or testicular function. Changes in blood pressure suggest a disturbed adrenal gland. The blood pressure is characterized in such cases by a high systolic but a normal diastolic reading, until the terminal phases of the disease are reached, when the diastolic pressure departs from normal and rises. Altered sugar tolerance suggests involvement of the pancreas. Flushing of the skin, increased perspiration and intolerance of heat, point to a definite upset in the sympathetic nervous system. Vomiting and diarrhoea in the "hyperthyreoid crises" indicate involvement of the parasympathetic, while the fine tremor seen in the voluntary muscles demonstrates disorder in the somatic nervous system.

In searching for the aetiological factors responsible for the production of this picture, one is first attracted to normal physiological processes which frequently have mild degrees of intoxication accompanying them — menstruation, pregnancy and the menopause. In many instances the last named has not been considered as a possible cause of symptoms, and much valuable time has been lost in instituting proper treatment. Fatigue and emotional strain very often precede the develop-

ment of thyreoid intoxication. Infections of the respiratory tract, influenza and tonsillitis are precipitating factors in the production of toxic symptoms. McCarrison has suggested that the gland is capable of producing toxic substances other than thyroxine.

The classification of goitre used in the Surgical Department of the Toronto General Hospital is as follows:

(A) *Diffuse.*
- (a) 1. With hyperthyreoidism.
  2. With hyperthyreoidism—adolescent.
- (b) Without hyperthyreoidism.
- (c) With hypothyreoidism.

(B) *Nodular.*
- (a) With hyperthyreoidism.
- (b) Without hyperthyreoidism.
- (c) With hypothyreoidism.

(C) *Diffuse and Nodular.*
- (a) With hyperthyreoidism.
- (b) Without hyperthyreoidism.

(D) *Inflammatory.*
- (a) Acute suppurative. Non-suppurative.
- (b) Chronic.

(E) *Malignant.*
- (a) Carcinoma.
- (b) Sarcoma.

In one series of cases, some 60% fell into the Diffuse class, with hyperthyreoidism, 32% into the Diffuse and Nodular, with hyperthyreoidism, and 5% into the Nodular, with hyperthyreoidism.

There are two distinct clinical pictures seen in hyperthyreoidism. The first, seen in persons under forty years of age (commonly between twenty and thirty-five), runs an acute fulminating course, and rapidly reaches the stage where the patient is confined to bed. The second, comes on gradually and insidiously and is associated with a nodular enlargement of the gland of many years' standing. Such cases come to the physician about the age of fifty. Fatigue is often their only complaint.

A diagnosis of thyreoid intoxication is based upon the following symptoms: tachycardia, fatigue, tremor, loss of weight (despite increased appetite), heat intolerance, flushing and excessive perspiration. The value of basal metabolic rate determinations has been greatly overestimated. So many factors can influence the validity of the test that one should not place too much reliance on the results obtained. Furthermore, the basal metabolic rate may be within normal limits in toxic cases. Pregnancy, fever, and leukaemia have been associated with an increased basal metabolic rate.

Therapy.

The indications for the use of iodine are:

(1) Prophylactic:
- (a) Given to children, starting at 10 to 12 years of age and continuing to 20 years of age, using 10 mgm. of iodostarine once weekly, thirty weeks in the year.
- (b) A similar dose given to women during pregnancy.

(2) In the treatment of adolescent goitre.

(3) To patients under 25 years of age, suffering from harmless colloid goitre. A combination of small doses of thyreoid extract with iodine more often causes a regression in the size of such glands than when iodine or thyreoid extract are administered alone.

(4) The pre- and post-operative administration of iodine. The pre-operative administration of iodine is carried out only when the patient is in hospital, prepared to submit to resection of the gland when the optimum time for such procedure arrives. Pre-operative iodine therapy consists in the administration of Lugol's solution, 10 minims, three times a day for 10 days to 2 weeks. Post-operative treatment is prolonged — 5 to 10 minims, three times a day, for six to twelve weeks following resection.

In frank cases of thyreoid intoxication, radical resection of the gland is indicated. Patients over 25 years of age with nodular goitres should be operated upon and the nodules resected. At least 20% of such cases will become toxic later on. From 2 to 4% of them will become malignant. Many of the nodules will become cystic and haemorrhage may occur into them. When hyperthyreoidism occurs during pregnancy it should be treated without regard to the pregnancy. Many patients who show cardio-vascular damage that cannot be explained by long standing endocarditis and who have nodular goitres should have the gland resected. The results obtained will, in many cases, amply justify such a procedure.

In dealing with patients, one puts all the facts before them as soon as treatment is undertaken. They are made to realize that operation is not a tragedy but a boon. It is most important that they develop a desire to be operated upon and are confident that the result will be successful. In determining the most opportune time for resection of the gland, the patient's demeanour and mental attitude are of the greatest value. A patient who has lost his apprehension, is placid, and ready to submit to operation at any time and yet who has a basal metabolic rate of + 30 and a pulse of 100 to 120, is in much better condition for operation than one with a basal metabolic rate of + 15 and a pulse of 90, who shows a tremor in both voice and hands, moist skin and flushed countenance, and is apprehensive, wondering when his operation will be undertaken. Flattening of the pulse curve is one of the most valuable signs in determining when to operate.

During post-operative care one must continually be on the watch for signs of thyreoid storm. Restlessness, combined with rising temperature and pulse rate, indicate an impending crisis. Vomiting and diarrhoea definitely establish the condition. In its treatment one administers fluids, sedatives and iodine.

In conclusion, after resection of the gland in toxic cases, a prolonged convalescence—of six months to a year (the first month being spent in bed, the second month lying down 18 hours a day, the third month in bed 12 hours per day, with short walks and drives)—is necessary to secure maximum benefit from treatment.

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MEDICAL SOCIETY.

The first open meeting of the Medical Society for this year was held on Thursday, November 19. Dr. Sandford English of Simcoe, Ontario, a graduate of the University of Toronto, addressed the Society on the general subject of medical economics. A brief outline of a system of account-keeping, evolved in his practice, was given. He stressed the need at the present time for reduction in medical fees. A very important factor which tends to increase the cost of medical treatment is the non-collection of bills. It was suggested that an efficient method of book-keeping on the part of practitioners would do much to reduce the number of unpaid bills.

Epidemic Encephalitis.

H. B. BURCHELL, '32.

Epidemic encephalitis was first accurately described by Von Economo in Vienna in 1917, who gave the name Encephalitis lethargica. The occurrence before this is a debatable question. A disease known as "Nona" with many similar characteristics occurred in Italy in 1890 after a pandemic of influenza. Camerarus in 1712 described a disease characterized by somnolence and disturbances of vision, but there is nothing to definitely classify it with the present disease. Since 1917 no part of the world has escaped the ravages, and in England in 1924 over five thousand cases had been reported. An extract of the earliest literature, Lancet, 1918, states: evidence now available suggests we are dealing with a form of infection akin, no doubt, to the virus of poliomyelitis but not identical with it, — a form of infection which has a special tendency to involve the oculomotor nuclei and the dissemination of which through the brain is associated with the special clinical symptom of lethargy or stupor." At this time the disease in the acute phase was sometimes mistaken for botulism. Due to the intimate time relation to the influenza epidemics, and many cases being diagnosed in the acute phase as influenza, it was thought that the disease was perhaps a cerebral type of influenza. When its distinctive course was separately established this direct relationship was severed. The conservative opinion as found in text-books at the present time is that the causative agent is a virus. This virus is apparently closely related to the virus of Herpes, which will readily produce encephalitis in experimental animals. Rosenow and Freeman believe they isolated a streptococcus from the nose and throat secretions of encephalitic patients which they believe is the etiological factor, as it can be cultured, and an injection will produce typical symptoms in animals.

The relation of epidemic hiccough is interesting. Two of the epidemics involving over three thousand cases occurred in Winnipeg in the years 1919 and 1924, and were coincident with, or followed by, epidemics of encephalitis. The exact relationship to epidemic encephalitis is not known. Rosenow invariably found a streptococcus in the nasal secretions of hiccough cases which produced hiccough in rabbits. Although little harm seemed to arise from epidemic hiccough, the disease as yet cannot be said to be of trivial importance.

Acute Phase of Epidemic Encephalitis.

The acute disease is usually ushered in by mild to severe headache and the development of drowsiness and stupor. In most cases there is delirium at some stage, and occasionally insomnia is a prominent symptom. The fever is not characteristic, but the pulse is consistently found to be accellerated, which remains so after the acute stage. Lesions of the cranial nerves are very characteristic of the disease, and diplopia is a very important early sign. The occurrence of involuntary movements of groups of muscles, that is, myoclonic spasms, are said to be almost pathognomonic of the disease. Hyperaesthesia and severe neuralgia may occur, so that even an acute appendix may be simulated in rare cases. The pupils are often irregular and inactive and the deep reflexes unequal and hyperactive. The symptoms vary markedly in duration and severity, so that even malaise and diplopia in the presence of an epidemic may make a diagnosis.

Examination of the blood usually shows a mild leucocytosis (10-12000). The spinal fluid is seldom increased in pressure; the cell count is often normal and rarely exceeds one hundred, any increase being due to lymphocytes; the Wasserman is negative, but occasionally

a tabetic gold curve is obtained, and lastly there is an increased sugar content. The latter is a very constant finding, ordinary Benedict's solution is reduced by it, and this is a differentiating point from tuberculous meningitis where the sugar content is decreased.

The prognosis in the acute phase is differently estimated, but that given by Hall is most readily remembered: of one hundred patients with acute encephalitis twenty-five will die in the acute phase, twenty-five will recover completely, fifty will develop sequelae of which twenty-five will show Parkinsonism. The immediate prognosis in the acute phase depends upon the severity of the symptoms. The lethargy may last for days, occasionally weeks, and exceptionally months. Patients showing a deep coma with respiratory disorders have the poorest outlook.

The Chronic Phase.

The most pronounced so-called sequelae of encephalitis occur from six to eighteen months after the primary attack, although in the majority of instances at no time in the interval is the patient completely well. The degree of seriousness of the chronic phase may bear no relationship to the degree of illness in the acute phase. A large number of post-encephalitics develop Parkinson's syndrome, called so since it resembles Paralysis Agitans (Parkinon's Disease). These people present very typical appearances which usually can be recognized with ease. The picture syndrome is due to a basic hypertonicity of the skeletal muscle. The face has a mask-like, wooden appearance, the eyes are fixed, the neck slightly flexed, the arms are stiff and held in a slightly flexed position. The characteristic gait is stiff and somewhat festinating, the trunk and head immobile, the eyes apparently concentrated on a distant object and the arms motionless or moving slightly at the shoulder. Often extreme slowness of movement, unrecognized by the patient if all the body is involved, is found to be an initial symptom. Dysphagia is a common complaint which is more noticeable to the patient due to the sialorrhea which is quite commonly so severe as to cause actual drooling of saliva. Seborrhoea often occurs, giving the face a greasy appearance; and a tendency to adiposity is not rarely observed.

Respiratory disorders are frequent and may be classed into three groups: (1) Disorders of respiratory rate; (2) Dysrhythmias such as sighs, apnoea or breath-holding spells; (3) Respiratory tics as hiccough, yawning, tic-like expirations through the nose and spasmodic cough. These may occur as symptoms in any phase of the disease or may constitute the sole after effect. They are commonly associated with other findings. It is believed that they are particularly prone to co-exist with inversion of the sleep rhythm and disorders of conduct.

Oculogyric cries,—that is, ocular spasms in which the eyes are involuntarily rotated, are not unusual. They usually occur in the afternoon and last from a few minutes to several hours. They are associated in some cases with pain, profuse sweating, salivation, thirst and tremor. Jeliffe believes that many of these features are due to an anxiety neurosis rather than a purely organic condition. This is confirmed by the fact that reading will sometimes prevent, or some irrelevant medication has been seen to curtail the attack. Hohman reported several cases in which forced conjugate deviation of the eyes occurred without any other objective or subjective disturbance.

Pardee reported cases usually found associated with a variety of signs as diplopia, nystagmus, breathing spasms and emotional crises with euphoria. Spasms in which the eyes are turned upward and to the left seem more common, but the direction of the deviation may change in an individual case. Association with a cephalogyric torsion may be seen. The immediate cause of the crisis is probably fatigue, emotion, or metabolic accumulation.

Paresis of muscle groups may occur

and spastic diplegia and paraplegia are not uncommon. Tremor is not as characteristic a sign as it is in paralysis agitans. In odd cases epileptic manifestations and diabetis insipidus have been reported as sequelae.

Prognosis of the chronic stage cannot be accurately estimated from the data now available, but few cases die in the early chronic state. Some cases progress into chronic invalidism, others remain unchanged for many years, while some present recrudesences of symptoms after latent periods. However, it might be of interest here to state that in Ontario in the three years 1927-8-9 there have been one hundred and forty-three deaths due to the disease and in the same period fifty-eight new cases were reported.

Psychiatric Aspects.

In the acute stages the psychic disturbances present the general characteristics of an organic type of mental reaction, corresponding more specifically to a toxic infectious psychosis. The most comon findings in this period are psychic torpor and delirium, although rarely other complex disorders as hysterical reactions, or even a Korsakow's syndrome may occur. This is called the irritative stage by some writers and the symptoms are said to reflect patient's makeup previous to infection. There is complete or partial amnesia during this period.

In relation to the chronic stage the development of a psychosis follows no fixed rule. In New York State during the past eight years over four thousand cases of encephalitis were reported, over two thousand deaths, and in the same period four hundred first admissions to state hopitals of afflicted persons, meaning that at least fifteen percent. of post-encephalitics develop an incapacitating mental condition. Thus the percentage developing a psychosis, sufficiently anti-social to necessitate confinement, is relatively small. The mental phenomena developing in Parkinsonism are very bizzare, but a constant finding is a diminished mental tension. Any of the following syndomes may be present: (1) Great pressure of speech without distortion or mood alteration, (2) Euphoria and jocularity, (3) States of stupor, (4) Behavior oddities often truly impulsive, (5) Depression, (6) Emotional instability. The four reaction types given by Hohman which are: (1) The Depressive, (2) The Psychroneurotic, (3) The Delirious, (4) The Organic, include the majority of cases. The production of an euphoria is very common and a manic-depressive psychosis may be simulated, while other patients may develop an apathy and hallucinations characteristically found in Schizophrenia. Alterations in character and mood as emotional elevations, irritability, stubbornness, erotism and explosive reactions are in some instances the only evidence of lack of recovery. There is often an alertness and unexpected mental clearness or arousing the patient from stupor. Emotional response can be obtained from almost every patient, and there is never the dissociation of affect as found in the schizophrenic. A remarkable and surprising feature of the Parkinsonians is the ability to do rapid and intricate movements on impulse, followed by rapid relapse back to their former hypertonic, clumsy state. Catalepsy may be present in severe cases.

In regard to post-encephalitic children, behavior, disorders and mental and moral degeneration are the common psychotic findings. In New York state a hospital unit, accommodating fifty children was established soon after the epidemic and is still operating at capacity. The actions of the children are similar to psychopathic children, but the children themselves are different, as the particular environment is not a determining factor of their actions. Most of the children are admitted two to five years after the onset, although behavior disorders usually directly follow convalescence. The prominent symptoms are restless overactivity, emotional irritability and impulsiveness. They fight, lie and steal

impulsively and are often constantly annoying. A progressive dullness seems the most common termination of this emotional upset. About fifty per cent. of the children showed the Parkinson syndrome on admission.

Pathology.

In the study of the pathology the naked eye appearances are not striking, there being some congestion of the meninges, occasionally small meningeal haemorrhages and minute haemorrhages involving the gray matter, particularly that of the basal ganglia. Different pathological localizations depend on the type of case, such as, (1) Cases characterized by hemiplegia, hemianaesthesia, hemianopia, (2) Those characterized by symptoms of paralysis agitans, (3) Those characterized by disturbances of the function of the cranial nerves. The wealth of pathology is of great value in working out portions of the nervous system not well understood. Microscopically the main lesions are, (1) Small celled infiltration of lymphocytes and plasma cells of the perivascular lymphatics especially of the small veins. This inflammatory perivascular infiltration is particularly characteristic and is found after some years in conjunction with obviously older pathological changes, (2) Patchy infiltration by neuroglia cells of the nuclei of the cranial nerves and basal ganglia with degeneration of some of the associated nerve cells. In old cases dying from Parkinsonism there is a marked loss of cells in the sutstantia nigra and corpus striatum with proliferation of neuroglia lesion. It is now believed that the production of the post-encephalitic paralysis agitans is due to the lesion in the substantia nigra although the lesions of the globus pallidus may play a minor part.

The paralysis of the cranial nerves, usually of the eye and face, is explained by scattered lesions involving these nuclei. The lethargy has been explained by an internal hydrocephalus producing pressure on the thalamus or pituitary. The sialorrhoea and seborrhoea are due to interference of the nervous control, and are probably due to lesions in the sub-thalamic nuclei which have important connections with the vegetative system.

The pathogenesis of the respiratory orders is stated to be at a higher level than the respiratory centre and lies in the derangement of the involuntary psychomotor control maintained by various cortico-pontine pathways. The conjugate deviation of the eyes is probably dependent on a lesion involving the posterior longitudinal fasiculus or the anterior corpora quadrigemina. The obesity and diabetes insipidus could both be explained by a pressure atrophy of the posterior pituitary. The cause of the epilepsy is differently stated to be, a toxic irritation, a metabolic irritation resulting from closure of lymphatics, or a temporary anaemia.

Treatment.

During the acute manifestations salicylates (Gr. V. q. 2 h.) are the medicinal preparations recommended. Colloidal materials, such as milk, may be given for their non-specific effect on the immune bodies. Attempts at serotherapy using Rosenow's anti-streptococcic serum are promising, but the question of specificity is not yet solved. Repeated lumbar puncture is of definite value if the spinal fluid is under increased pressure. In the treatment of hiccough, benzyl benzoate (M. VI. q. 4 h.) has been of decided value. The spasmodic cough when present is very intractable. Ultra violet and X-ray therapy have been used, but have proved to be of no help in checking the disease process.

During the latent period, or with convalescence, foci of infection should be eradicated. Favourable indications in the prevention of sequelae by immunization by killed streptococci have been reported by Freeman.

In the chronic state treatment is usually palliative although shock treatment by intraspinal protein injection

has caused a marked temporary improvement. Malarial treatment is of little help and McGowan condemns malarial therapy as thoroughly useless and unjustifiable. The main drugs used are hyoscine (scopolamine), bellodonna and stramonium. Hyoscine Hydrobromide is the usual form chosen (1/200 gr. may be given three or four times a day or 1/100 b.i.d.). There is a slight decrease in the general muscle tone, salivary secretion is diminished and oculogyric crises may be averted. Hall reports remarkable success with Tincture of Belladona (10-20-30 M. t.i.d.) in the relief of the whole syndrome, particularly improvement in the muscles and to a lesser extent in the mental condition. Hurst recommends a mixture of hyoscine (1/200) pilocarpine (1/5) and strychnine (M iii.) three times a day.

The latest treatment advocated is Tincture of stramonium of which the optimum dosage for the B. P. Tincture is 50-90 M. t.i.d. On this treatment there is a lessening of the rigidity and increase in the ability to perform fine, rapid movements although all cases are not affected equally. Excessive salivation is stopped, oculogyric crisis lessened in number and severity and the complexion improved. Toxic symptoms are rare, indications for reducing the dosage, which is begun at 20 M. a dose and increased 5 M. each week, are xerostomia, blurring of vision, anorexia, or dizziness.

Summary.

1. Encephalitis lethargica should be looked upon as a chronic disease rather than an acute disease with sequelae. Tardy identification of cases might often occur unless the possible incidence is constantly borne in mind.

2. The primary basis in the development of a psychosis is an organic condition. Psychogenic mental abnormalities, frequently related to the patient's former personality, may be superimposed. These may show little corelation with the organic condition, but are necessarily modified by the extent of mental degeneration.

3. Although the pathology is well established, the neurologists are in active disagreement as regards the pathological interpretation of many of the symptoms.

4. Treatment in the acute phase is symptomatic, probably the best treatment in Parkinsonism is stramonium.

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Gastric Neoplasms.

By D. Y. SOLANDT, M.A., '33.

Cancer is to-day one of the most important causes of death. Statistically it stands high in the ranks of the killers of mankind. About seven per cent. of all deaths in civilized countries, where statistics are available, are due to cancer. Of these one third are malignant conditions of the stomach and this organ is more subject to neoplasms which terminate fatally than any other single organ in the body.

Saltzstein and Sandweiss, working in Detroit, collected data on all the deaths from gastric neoplasm in that city for one year. Of the 365 such deaths which occurred only 7.7 per cent had undergone resections of the stomach. As we shall see later, resection is probably the only curative measure at our disposal for the condition. Another small, unselected group of cases collected by the Department of

Pathology of the University of Minnesota show that in 176 cases 40, or 23 per cent. showed no metastasis or involvement of any organ except the stomach. Horsley, commenting on these two series of cases, states that operative treatment would be entirely justified in a large group of gastric neoplasms which are at present allowed to terminate fatally, having received nothing but palliative treatment. This contention would seem to be largely speculative at the present time and its verification or contradiction lies ahead. In the meantime it is possible to strike nearer the root of the matter by reducing the number of inoperable cases through earlier diagnosis.

The symptomatology of gastric malignancy is peculiarly bizarre. It is only through a thorough understanding of the various possible pathological conditions of the organ and their effects on normal structure and psysiology, that we can hope to secure an early diagnosis in the majority of cases.

Pathological Classification.

Ewing finds six distinct types of gastric carcinoma. One of his group is that of "carcinoma following peptic ulcer." This involves a highly contentious point in the etiology of the condition and is probably best avoided. Boyd outlines a somewhat simpler classification involving only three definite types of carninoma. Boyd's grouping is on the basis of gross pathology and is, therefore, of greater clinical use than the more complicated histological systems.

Gastric neoplasms include benign and malignant growths, the latter group consisting chiefly of the carcinomata and sarcomata. The complications and difficulties of classification lie in the realm of the carninomata, which group includes the vast bulk of all neoplasms of the stomach.

Benign Gastric Neoplasms.

(a) Myoma.

The commonest benign tumour of the stomach. Arises from the muscular layer and may project into the lumen of the stomach or into the peritoneal cavity. It is usually single and may attain great size.

(b) Fibroma.

(c) Fibroadenoma.

(d) Lipoma.

(e) Hemangioma.

(f) Diffuse Gastric Polyposis.

Soft, discrete polyps of an adenomatous nature and about the size of a peo. May be diffusely scattered over the whole mucosal surface or sharply limited to one area. Said to become malignant at times.

Malignant Gastric Neoplasms.

(1) *Sarcoma.*

(All forms are very rare)

(a) Myosarcoma.

(b) Round- and Spindle-Celled Sarcomata.

(c) Lymphosarcoma (not a true sarcoma—Hodgkins Disease).

(2) *Carcinoma* (After Boyd).

(a) Massive or Proliferating Form. Usually a large, soft and fungating mass projecting into the lumen of the stomach. Most frequently at the pylorus and may cause obstruction. Tends to ulcerate and become secondarily infected in the late stages. Histologically is an adenocarcinoma which replaces normal mucosa and may penetrate as deeply as the subserosa. This tumour is not as malignant as the two following types.

(b) Sessile Ulcerating Form.

The commonest form of gastric carcimona. Tumour is not bulky and is only slightly raised from the mucosal surface. Replaces the mucosa and may erode to the serous coat. The malignant cells are usually arranged in columns in the wall of the organ. Usually found in the region of the pylorus.

(c) Infiltrating Form.

The "leather-bottle" stomach or linitis plastica. No real tumour to be seen, but there is an induration of the stomach wall and a seeding of malignant cells through the wall. These changes

are usually diffuse, resulting in a small organ with a greatly thickened wall. The infiltration and induration may be local, in which case the site is usually at or near the pyorus, which, however, is rarely obstructed.

It will be noted that this classification makes no mention of the so-called colloid carcimona of the stomach. The colloid form is considered to be simply the result of a gelatinous degeneration of a carcinoma of one of the regular types. The course of the growth is not altered by the colloid change.

Considering the above classification we must always bear in mind the obvious fallacy of any classification where biological processes are involved. No matter how astutely the divisions are made the differentiations will remain largely arbitrary. Pidgeon-holing is not one of Nature's processes. Classifications must be used as a basis from which to work and not as an end to be gained.

The metastases of gastric carcinoma are a very important but variable manifestation of the condition. The metastases seem to bear no relation to the degree of malignancy of the primary growth or to its size. Small, slow-growing tumours may give rise to such extensive and malignant metastases that the site and nature of the primary growth is not recognized until autopsy. Warwick's statistics show that about 23 per cent. of gastric carcinomas, with a palpable tumour, have no extension beyond the stomach wall. The group from which this figure was derived was very small and other workers believe that the number of cases which escape metastases to such a late stage is much lower. The regional lymph glands are the most common sites of extension. The involvement regularly extends to the mediastinal and thence to the supraclavicular glands, particularly on the left side. The enlargement of the so-called sentinal gland of Virchow, one of the left supraclavicular group, coupled to the symptomatology of gastric upset is considered almost diagnostic of gastric malignancy. The metastatic spread may be by peritoneal seeding. The primary growth erodes into the peritoneal sac and we find little nodules of malignant growth over the surface of the investment. The extension here is probably by mechanical transportation of parts of the tumour mass to sites suitable for their growth. The ovary is frequently the part of election for such secondary growths, and it is said that 2 to 3 per cent. of all cases of cancers of the stomach show ovarian growths.

The lungs, the brain, the spinal cord, the kidney and the bones are all occasionally the site of secondary growths from a primary neoplasm in the stomach. The pancreas is sometimes involved by direct extension of the tumour mass, a condition to which the adjacent duodenum is never subject.

Etiology.

The exact role played by peptic ulcer in the causation of gastric malignacies is one of the most debated questions in the realms of the medical sciences. MacCarty and his co-workers in the Mayo Clinic have held for a long time that the majority of gastric cancers are superimposed on peptic ulcers. This group claimed that at least 70 per cent. of all gastric cancers showed histological evidence of a preceeding ulcer. They have lowered this figure more recently, but still believe that a large proportion of all cancers of the stomach involve peptic ulcer as an etiological factor. Most other workers find no evidence to support MacCarty's extreme views and lower his figure variously from 70 to between 1 and 10 per cent. It may further be pointed out that these figures represent cases where a new growth has involved an ulcerated area. The number of cases where the tumour can conclusively be shown to have sprung from tissue injured by the ulcerative process is very small indeed.

Apart from the factor of the peptic ulcer the question of the etiology of gastric neoplasms differs in no particular from the general question of the etiology of all neoplasms. The theories

of chronis irritation, chemical actions, radiant energy, dietary deficiency, lymph stasis, embryonic disturbances of tissue situation, infection and heredity all have their quota of protagonists. The matter is too broad, and a great deal of the evidence too nebulous, to be treated here. Perhaps the one important indication of the controversy is that the neoplasic changes cai be initiated in a number of different ways. The basic mechanism of either the neoplastic changes, or the processes by which they may be started are completely unknown.

Diagnosis.

The signs and symptoms on which a diagnosis must be based, are noted for their variability. If the diagnosis is simple it almost invariably follows that it has been made too late. In many cases the process has passed the point where a cure would be possible before the symptoms become sufficiently marked to take the patient to a doctor.

The symptom which first brings the patient to the doctor, in a large majority of cases, is indigestion or epigastric discomfort. In the statistics gathered by Saltzstein and Sandweiss about 20 per cent. of their group of cases show a history of stomach trouble over a prolonged period, before the diagnosis of gastric neoplasm was made. About 40 per cent. came to the doctor with indigestion as their first complaint. About half of these had an added complaint of some loss of weight and weakness, while one-fifth had noticed a definite loss of appetite. Some 10 per cent. of the total group of cases showed a previous history typical of peptic ulcer and another 10 per cent. had epigastric pain as their chief complaint, but not linked to a typical peptic ulcer history. Vomiting was the primary complaint in 8 per cent. of the cases. In isolated cases difficulty in swallowing, gastric haemorrhage and distended abdomen have been recorded as the first complaints. From the foregoing it will be realized that there is no very definite symtomatology on which we can pin a diagnosis.

The signs, at the early stage at which a judgement must be given, are no more definite than the symptoms. Palpable abdominal tumour or enlarged supraclavicular lymph glands are usually such late manifestations that we cannot allow ourselves to rely on them at all. In fact, apart from noting the general physical condition of the patient, the physical examination of the patient, in the early stages of the disease, is of little use.

The laboratory and radiographical findings, and especially the latter, can help materially. A test meal followed by a removal of the stomach contents should be a routine in all suspected cases. A certain proportion of gastric neoplasms show an accompanying achlorhydria. This is indicative but not diagnostic. An achlorhydria due to neoplasm is said to resist injections of histamine. The stomach contents may be tested for lactic acid, and if positive this is again a good indication, but not an infallible proof of the existence of neoplasm. Both hypoacidity or achlorhydria and lactic acid production may appear very late in the condition, and so must not be relied upon.

The X-ray is probably the most accurate means of making an early and a definite diagnosis. Any patient, over thirty-five years of age, showing any single sign or symptom which might be a manifestation of gastric neoplasm, should have a gastric radiological series performed without delay. X-ray findings are quite reliable, and it is a debatable point whether an exploratory laparatomy, in the face of negative findings, is advisable. Probably, with a very suggestive symptomatology, even in the absence of all signs and with negative laboratory and X-ray findings, it is in the best interests of the patient to take this latter course.

Treatment.

In treatment, as in the discussion on diagnosis, we are chiefly interested in the commonest gastric neoplasm, the

carcinoma. For this condition there is apparently only one lasting cure, and that is complete removal of the carcinomatous tissue. Very often such removal is incompatible with life, and the therapeutic measures must be merely palliative.

When the process is discovered in time a partial, or more rarely, a complete gastrectomy is performed. As some 70 per cent. of all gastric carcinomas involve only the pyloric region and another 20 per cent. only the lower part of the lesser curvature, a partial gastrectomy is sufficiently radical in the majority of operable cases. The regional lymph nodes and lymphatics must also be removed.

With the present state of our knowledge medical treatment is, of necessity, only palliative. Such treatment will vary greatly with the condition of the patient and the nature of the neoplastic process. Steps must be taken to keep the patient nourished and free from pain. Efforts to prolong life by causing a regression of the tumour, with X-ray irradiation or by the injection of certain metals in colloidal form, are sometimes made. Such regression is, of course, quite temporary. At times the condition of the patient may justify a gastrostomy or a gastro-enterostomy as purely palliative measures.

Surgery offers the only chance of cure, and only presents this opportunity in the early stages of the neoplastic process. For this reason medical treatment is probably only justified when the condition is inoperable, when the patient refuses operation, or when a doubtful diagnosis is undergoing confirmation.

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Common Infections of the Hand (Part II.)

By G. M. BASTEDO, M.A., M.D., and KENT HARRISON, M.D.

IV. Collar Button Abscess.

(Shirt stud or dumb bell abscesses or Frog Felon).

This is a typical abscess which occurs towards the web edge of the palm under dermal and under epidermal tissue. In people doing manual labor the epithelium becomes hypertrophied, with formation of callouses. This thickened layer makes a sheet through which pus does not easily work and which allows pus to spread beneath it. The underlying derma develops more fibrous tissue with decreased blood supply which probably makes it less able to resist infection.

The palmar aponeurosis towards the distal edge of the palm divides into slips opposite each of the four fingers. These slips pass distally and end in palm, finger tissue and tendon sheaths over the head area of the metacarpals. Between these slips there is soft, fatty tissue in which run digital vessels and lumbrical tendons.

Now over metacarpal heads is epidermis, derma and slips of palmar aponeurosis. Over the spaces between metacarpal heads is epidermis, derma and fatty tissue of the above described lumbrical space.

Infection gets to the derma by lymphatic extension or direct innoculation through cracks in the hypertrophied epidermis. A localised abscess forms

in the derma and another between epidermis and derma. The two are joined by the original line of infection.

Over the metacarpal heads extension of pus dorsally is prevented by the slips of palmar aponeurosis, but between the metacarpal heads it may spread dorsally in the fatty tissue of the web and point at the dorsum of the web between the bases of the fingers.

Treatment: The treatment is to open both abscesses. After opening the first abscess probe or squeeze for a second one, and if present, enlarge its opening. If the abscess is in the web tissue the web should be cut from palmar to dorsal surface with no subsequent impairment of function.

This is followed by hot boracic acid dressings interrupted by soakings in hot boracic acid or normal saline solution for 20 minutes every four hours. These are stopped as soon as signs of exudative reaction have ceased and are replaced by dry gauze dressings.

V. Acute Lymphangitis.

Anatomy.—The lymphatic vessels are composed essentially of an endothelial lining reinforced with various amounts of smooth muscle and connective tissue, depending upon the size of the vessel.

The lymphatics are most numerous in the palmar surface of fingers and palm; the principal lymphatic vessels and glands are superficial to the large veins and are seldom deeply situated.

When the tissue is lax the lymphatics become dilated and tortuous with the formation often of microscopic and macroscopic glands. It is these areas which, becoming inflamed to the size of a pea, may give the false impression of localization of the process. The course of the lymphatics in the fingers is from the palmar surface of the fingers to the side and then to the dorsum at the base of the finger.

The lymphatics of the palm also pass to the dorsum by the nearest superficial route, except those of the central palmar area which pass to the vessels of the superficial palmar arch.

This helps to explain the usual spread of infection from palmar to dorsal surface. This palmar to dorsal route with the presence of loose tissue on the dorsum of the palm explains the great swelling so often found there.

There are about 30 lymphatics in the forearm which diminish to about 15 in the arm. In the forearm the collecting vessels tend to come to the anterior surface at about the cubital fossa. The loose fold of the elbow joint contains a dense network of lymphatics.

The majority of the lymphatics end in the humeral lymph glands of the axilla. Some of the most radial glands pass up in the deltopectoral groove to end in a subclavian lymph gland where the cephalic joins the axillary vein. Some of the most ulnar lymphatics end in the epitrochlear gland, whose efferents drain to the brachial vessels at about the middle of the arm.

Clinically there is a connection between the lymphatics of palmar surface of finger and tendon sheath as tenosynovitis may follow lymphangitis of a finger.

The lymphatics from the little and ring finger most often show a clinical drainage to the epitrochlear gland and thence to the axilla. The thumb and index finger drain directly to the axilla and so are perhaps more likely to produce early systemic reactions. Occasionally infections of the middle finger spread directly to the subclavian glands.

The deep lymphatics accompany the main vessels of the extremity and are two to a vessel. With the involvement of these deep lymphatics abscess formation is likely to take place, often in the lumbrical space.

Etiology: The infection follows most often a slight superficial wound or prick in the palm or finger. This lesion is often unnoticed or recalled with difficulty by the patient. Cracks in the callous of the palm are also common sources.

Pathology: The reaction in the lym-

phatic vessels is chiefly manifested by oedema and lymphocytes. Unless the vessel is injured or cut the bacteria are usually confined to the lumen or wall of the vessel. There is a slight lymphocytic exudate surrounding the lymphatic vessel with dilatation of the capillaries which with the swollen lymphatic produce the red raised streak.

A thrombus is often seen in the lymphatic vessel formed of serum, lymphocytes and bacteria.

Signs and Symptoms: The original site of the infection may be swollen, red and painful or show no change. If in the terminal phalanx it is more likely to be painful, but the phalanx is soft compared to the induration of a felon.

The tell-tale red streaks are seen and felt extending up the dorsum of hand and forearm. These areas may or may not be swollen. The epitrochlear and axillary glands are usually tender within 24 hours.

Profound systemic manifestations occur early, and perhaps usher in the infection. These are commonly chills, great prostration, headache, anorexia, with rise of pulse and of temperature to 102 to 103°.

If the infection started in the finger it may be swollen, but there is not the great tenderness of tenosynovitis. In the palm, although its concavity may be lost, there is no palmar bulging until the palmar spaces are involved.

The course of the attack may be used to classify it into one of four types.

Type 1, simple acute lymphagitis in which all signs and symptoms may subside in 24-48 hours or thereabouts.

Types 2 and 3, acute lymphangitis with which are associated slight or severe local manifestation respectively. Of the slight complications a local abscess in the finger or on back of hand may be cited. Of the severe complications tenosynovitis, palmar space abscess and cellulitis of dorsum of palm and forearm may be cited.

In cellulitis of the dorsum of palm and forearm the infection spreads in the subcutaneous tissue causing necrosis of it and the overlying skin. The parts are greatly swollen and hard, giving the appearance of trying to burst through the skin.

Small, often haemorrhagic, blisters are seen in the skin. The systemic absorption is severe and thrombophlebitis may occur to threaten death even with cessation of lymphangitis. This is one of the most severe types.

Type 4. That of acute lymphangitis with very severe systemic manifestations which threaten life. In these the local reaction is usually slight. Metastatic infection usually causes death.

Treatment: The treatment is to help the body wall off the infection and sustain the toxins. This is accomplished by rest, heat, increased fluid intake and excretion.

For rest the patient is put to bed with the hand and arm perfectly quiet. The hand is raised if it helps to relieve the pain of congestion. Sedatives are given to procure sleep.

Heat is applied by soaking the arm and hand in hot boracic acid or normal saline baths for 20 minutes every 3 or 4 hours, day and night, if severe. Between the baths the hand and arm are covered by numerous hot boracic acid dressings. The hot baths are continued until the local signs of active inflammation such as the red streaks and any acute oedema have gone. After this, dry dressings may be used.

Incisions are not made unless definite signs of pus are found. Incisions open up new lymphatics for the toxins and bacteria to spread systematically as well as locally.

VI.—Fascial Space Infection.

The fascial spaces of the hand are Mid-Palmar, Thenar, Hypothenar, Lumbrical, Web, Dorsal Subcutaneous and Dorsal Subaponeurotic.

Anatomy.—The Mid-Palmar fascial space is an area of loose connective tissue lying between the third metacarpal bone and the radial side of the fifth metacarpal, limited on the radial side by the fibrous sheath of the Adductor

Transversus, and on the ulnar side by dense fibrous tissue covering the hypothenar group of muscles. It is deep to everything in the palm, but the mid palmar sheet of connective tissue, the interosseous vessels and nerves and the palmar interosseous membrane. Superficial to it are skin and subdermal connective tissue, the palmar aponeurosis, a loose mass of connective tissue, in which lie vessels, flexor tendons and lumbrical muscles, and the anterior palmar sheath. The anterior palmar sheath separates it completely from the flexor tendons and lumbricals, but this sheath is not a dense one. The sheath of the Adductor Transversus is dense proximally, but thins out at the distal end of the space.

The Thenar space lies in the area of the thenar eminence, deep in the palm, being just superficial to the transverse head of the Adductor Brevis. It lies entirely lateral to the third metacarpal bone and is limited laterally at the level of the palmar surface of the bone. Superficial to the thenar space are structures corresponding completely to those overlying the mid-palmar space in the intermuscular septa between the muscles of the hypothenar eminence. It is not important since it does not communicate with other fascial spaces.

Lumbrical spaces are merely within the sheaths which surround the lumbrical muscles. These spaces are important as they afford an entrance of infection and an exit of pus, connecting, as they do, the deeper structures of the mid palm with the more superficial tissue of the distal part of the palm. The lumbrical muscles, it will be remembered, arise from the flexor tendons, deep in the palm, and are inserted into the radial side of the aponeuroses of the Extensor Digitorum Communis, covering the dorsal aspect of the fingers. The first Lumbrical serves as a communication with the thenar space, while Lumbricals II., III. and IV. communicate with the mid-palmar space, although of course these spaces are separated from the mid-palmar space by the anterior mid-palmar fascia, as the first Lumbrical is separated from the thenar space by fascia corresponding to this.

The web space is an area of loose connective tissue, between the bases of the fingers, being continuous distally into the subcutaneous tissue at the sides of the fingers, and proximally on the dorsal aspect, with the dorsal subcutaneous space, and on the palmar aspect, with the connective tissue spaces around the Lumbrical muscles.

The Dorsal Subcutaneous space is loose connective tissue; without definite boundaries, but superficial to the dorsal aponeurosis.

The Dorsal Subaponeurotic space is limited dorsally by the dense aponeurosis of the extensor muscle tendons, and on the deeper aspect by the metacarpal bones and Interossei muscles.

Clinical Features of Fascial Space Infection.—Fascial space infection may occur in several ways:

1. Direct implantation into fascial spaces by wounds, etc.

2. Involvement from tendon sheath infections.

3. Involvement by lymphatic extension.

4. Extension from one fascial space to another.

5. Osteomyelitis of metacarpal bones and rarely from suppurative arthritis.

Only a few remarks are necessary in discussion of the source of fascial space infection:

(a) Puncture wounds need not necessarily directly penetrate the fascial space in order to produce an abscess. For example,—when the tendons of the palm are exposed by a wound, great care must be taken or the mid-palmar or thenar space may become involved by spread of the infection through the thin sheet of fascia separating these tendons from the respective space. This necessitates scrupulous care in the treatment of such wounds.

(b) Tendon sheath infections of the middle, ring and little fingers may in-

fect the mid-palmar space, while infections of the index finger are more likely to produce an abscess in the thenar space. They may do this either primarily or by the production first of a lumbrical space infection. It is stated that fascial space infections may complicate tenosynovitis without rupture of the tendon. This is difficult to demonstrate. Infections of the tendon sheath of the Flexor Pollicus Longus rarely affects any fascial space.

(c) Lymphatic extension from the index finger and part of the middle finger may lead to thenar abscesses. Extension from the remainder of the middle finger and the other two fingers may start a suppurative process in the mid-palmar space. The superficial lmyphatics of the palm drain into lymph channels on the dorsum by encircling the edge of the palm. Deeper lymph vessels on the palm drain into channels which follow the deeper palmar vessels. Thus an infection in the palm may reach the mid-palmar or thenar space by this route.

(d) As regards communication of one space with the other, the most important feature is the close approximation of the lumbrical spaces to the thenar and mid-palmar spaces and the approximation of the lumbrical spaces into the web connective tissue. Thus, a palmar abscess may track along a lumbrical canal to the web space and point on the dorsum of the web. The thenar and mid-palmar spaces are walled off by dense connective tissue proximally, but this layer is thin at the distal part of the palm. The hypothenar space is completely walled off by dense connective tissue. The dorsal subcutaneous and subaponeurotic spaces are completely separated by the extensor aponeurosis and volar abscesses very rarely reach the dorsum by any other route than via the web as already mentioned.

(e) Fascial space abscesses may obviously originate from compound fractures of metacarpal bones, from osteomyelitis or from suppurative arthritis of the metacarpo-phalangeal joints.

Signs and Symptoms of Fascial Space Abscesses.

General.—Systemic signs and symptoms are much the same as those seen in acute suppurative infections elsewhere. Temperature may be as high as 102° to 103°. Sleeplessness, sweating and general malaise are usually present. Enlargement of the regional lymph glands is common.

Local.—The most important symptom is pain in the area involved and the most important localizing sign is tenderness on pressure. The other cardinal signs of acute inflammation may or may not be present.

With mid-palmar abscesses, along with pain and tenderness, it will usually be seen that the concavity of the palm is lost; there may actually be bulging in this region. With these abscesses the redness may be obscured by a horny callous hand. The position of the fingers is usually that of semi-flexion, yet it does not cause exquisite pain when the finger is extended. Fluctuation is rarely of any value, due to the depth of the pus. The dorsum is usually greatly swollen in volar abscesses, but this swelling is of an oedematous nature and but little tenderness can be elicited here.

Thenar space abscesses are much more easily diagnosed, as bulging of the thenar eminence can be seen, along with the other signs. This bulging is of an indurated type and must not be confused with the oedematous bulging of the thenar eminence which accompanies a mid-palmar abscess.

Lumbrical space abscesses show the same general signs, with tenderness most marked along the lumbrical canal. To ascertain whether or not a mid-palmar abscess accompanies a lumbrical abscess is sometimes very difficult and can then be done only by thorough exploration of the abscess cavity at operation.

To decide whether or not pus is present is sometimes difficult. In this decision one must take into consideration the duration of the pain, the systemic

condition of the patient and the source of the infection, as well as the local signs spoken of above.

Treatment.

(a) Before pus has formed, patient should be given hot hand baths every three or four hours with hot compresses in the interval, along with a good laxative.

(b) When pus has formed—immediate incision and drainage. It is better to err on the side of radicalism in the treatment of these cases. Operation should not be delayed because of such complications as tenosynovitis, bursitis, osteomyelitis and local extension of the abscess cavity. For mid-palmar, lumbrical and web space abscesses a general anaesthetic and bloodless field are essential, as is also the case in thenar abscesses, when there is a possibility of anything but a very superficial abscess. A very satisfactory field can be obtained by inflating a sphygmomanometer cuff on the arm after the arm has been raised to allow the venous blood to drain out of it.

Web space and lumbrical abscesses are best treated by incision along the lumbrical canal affected. The incision is made of ample length, the edges retracted, pus evacuated and the abscess is explored. If the mid-palmar space is found to be infected, a pair of forceps should be shoved down beneath the tendons and spread to permit ample drainage. A piece of gauze packing is put into the wound to be left 24 hours. The hand should be put in a hot dressing after operation and patient should have hand baths every three hours with hot dressing in the interval, until the abscess has subsided.

Incision into the thenar space should be made over the distal part of the first metacarpal bone and the same procedure as for other palmar abscesses used post-operatively.

Dorsal and Hypothenar abscesses should be opened in the position as indicated by the point of maximal tenderness and swelling.

VII. Paronychia.

Paronychia are infections around the foot of the nail.

Anatomy.—The nails are flattened, elastic structures of horny texture, implanted by a portion called the root, into a groove in the skin of the dorsal surface of each of the terminal phalanges. The exposed portion is called the body and the distal extremity the free edge. The deeper layer of the nail is firmly adherent to the dermis or corium, which is called the nail matrix. This underlying dermis is vascular, and near the nail root the papillae are smaller and the attachment is not so firm. Thus the paler coloring of the nail near its root is accounted for and this exposed pale crescent-shaped area is called the lunula. Folded over the lunula in a thin cuticular fold, is the eponychium, which is a continuation of the outer layer of the epidermis, the stratum corneum. The horny part of the nail is a greatly thickened continuation of the stratum lucidum, while the deeper surface of the nail is also of epidermal origin, being continuous with the stratum mucosum. The nail grows in length by proliferation of the stratum mucosum at the root of the nail and grows in thickness by proliferation of the stratum mucosum which underlies the lunula.

Clinical Features.—Infection may manifest itself in this region in either of two ways:

(a) *Small sub-epidermal abscesses under the cuticle.*—In these cases a superficial purulent exudate forms, usually as the result of an infected "hang nail." There may be some redness and induration of the base of the abscess. If opened early this type of infection subsides quickly, but if neglected it may develop into a typical runaround. There is usually little pain associated with the infection and it may be opened with as little pain as a blister in the same region.

(b) *Typical Paronychia.*—In this type of infection, the progress is slower, as the localization is more deeply seated. This infection may also result from

torn eponychium. Redness and swelling appear over the root of the nail at one side or another. The lesion is painful and tender to touch. A small amount of pus may be exuded under the eponychium, but since the tissues here are oedematous and tense, a free exit is not provided, and the pus spreads back to the nail sulcus and may pass across in this channel under the nail to the other side of the finger, presenting a red, raised ridge behind the eponychium.

Treatment—Usually, in these cases when the patient comes for treatment, pus is present. This is decided upon by the amount of induration, pain and tenderness along with the duration of the process. If there is only slight redness not much tension, little pain, and the symptoms and signs have been present only a day or two, hot dressings should be applied continuously till the infection has resolved or pus is present. When it has been decided that pus is present, an incision is made through the eponychium at the outer edge of the nail, and extended back as far as the sulcus. The eponychium is pushed back and the edge of the nail explored for the presence of underlying pus. If pus is present under the nail, it will separate nail from matrix, and so much nail should be cut away as is thus undermined. After the pus has been excavated, the incision should be loosely packed with gauze and hot boracic dressings put in the finger. Packing should be removed in 12-18 hours and boracic dressings applied every four hours for two days, at the end of which time, if a satisfactory excision has been done, the infection will have subsided. Then vaseline gauze should be applied until healing has taken place.

If infection has spread to the other side of the nail a second incision is indicated, on the opposite side of the nail in the same manner as above described.

It should be noted that the nail bed and overlying eponychium should not be cut other than at the lateral margin or a permanently split nail may result. If these structures have not been injured one can expect a good result even if the whole nail has been raised from its matrix by pus.

It is apparent that this operation should be done in a bloodless field, which may be produced by an elastic band wound tightly around the finger. The anaesthetic may either be general or the nerve supply from the finger may be cut off by infiltration of novacaine in and under the skin of the finger at the base of the proximal phalanx.

VIII. Felon or Whitlow.

A felon or whitlow is a subcutaneous infection of the palmar surface of the distal phalanx.

Anatomy.

The terminal phalanx of each finger has a peculiar arrangement of fascia and lymphatics. The fascia is attached to the ephiphysial line of the bone and encloses the fat and lymphatics distal to this line in a closed sac. This sac is sub-divided by sheets of fascia which radiate out from the bone to the subcutaneous fascia and thus make a number of compartments, the one end of which is at the periosteum of the bone and the other end at the subcutaneous fascia. The lymphatics of the finger drain directly downward from the skin to the subperiosteum.

Clinical Features.

Infection in this region is infection in a series of closed sacs, and the bone is often involved, whether due to the lymphatic arrangement or to a necrosis, which takes place as a result of the blood supply to the bone being shut off by increased pressure in the part. The felon often starts from an unnoticed injury. In a few days the patient notices a red indurated swelling of the terminal phalanx, and a severe throbbing pain. Tenderness is elicited on palpation. The felon will produce great damage before any softening occurs and bone necrosis with separation of the diaphysis from epiphysis may occur before pus breaks through to the skin surface.

Treatment:

The treatment is immediate ample incision. The favoured incision is one to the side of the finger in its long axis and opening toward the mid-line. This incision is often made through from one side of the finger to the other, depending on the severity of the case. The virtue of such an incision is that it provides free drainage from all the compartments of the phalanx above described. It has additional value because the tactile sense over the medial surface of the finger is not impaired. A drain is left in the incision for 24 hours.

Sometimes, when the pus is right at the tip of the finger an incision across the end of the finger is indicated or a J-shaped incision from the side around the tip. These incisions heal well.

A general anaesthetic is almost essential in order that an emple incision may be made. A drain, such as an elastic band, is left in the incision for 24 hours and hot boracic dressings applied every four hours. Results are good if bone necrosis has not taken place, and usually a patient will be forced to consult his physician before this occurs, due to the intense throbbing pain of the felon. Of course if the diaphysis is floating free in a sac of pus, it should be removed.

Internships in Canadian Hospitals.

The Department of Hospital Service of the Canadian Medical Association will issue within a few days a list of the hospitals in Canada which are approved for internship. The Basis of Approval, which was adopted after considerable consultation between the Canadian Medical Association, the Deans of the various medical colleges and leading hospital administrators, outlines the arrangements which must be made and the facilities which must be offered by hospitals desiring to be approved for internship. It is pointed out that the object of a general internship is twofold; it is both to provide efficient resident service for the patients and to round out the medical graduate's training so as to equip him to enter into the general practice of medicine. It is not to equip him to enter directly on any specialty.

In preparing the list of approved hospitals. The Committee of Approval has accepted only those which have a highly organized and conscientious medical staff, an up-to-date laboratory, a medical library, good records, autopsies on at least ten per cent. of the patients dying in the hospital, a satisfactory intern schedule and afford the interns ample opportunity for instruction. It is exceedingly gratifying to note that so many general hospitals in this country meet the requirements set forth and afford the graduate a year's training equal at least to that obtainable elsewhere. In a number of the hospitals a generous honorarium is provided, although it should be emphasized to the senior student that the difference of a few dollars is a very minor factor in comparison with the clinical experience offered.

A number of excellent hospitals which afford the intern good clinical training, but which do not fully comply with the Basis of Approval in one or more details, are being "recommended" rather than "approved," and these hospitals will be noted in the official list to be issued shortly.

This official list of "approved" and "recommended" hospitals is not quite ready for publication, as a number of hospitals are still being considered by the Committee of Approval, but the Editor has obtained from Dr. Harvey Agnew of the Canadian Medical Association a partial list of those hospitals which will be "approved." The official list with a full analysis of the services, etc., will be available shortly and may be obtained from the Department of

Hospital Service of the Canadian Medical Association at 184 College Street, Toronto.

PARTIAL LIST OF "APPROVED HOSPITALS."

Victoria General Hospital:
Halifax, N.S.; 250 beds, appointed May.

Saint John General Hospital:
Saint John, N.B.; 300 beds, appointed July, 6-8 interns.

Children's Memorial Hospital:
Montreal, Que.; 190 beds, appointed December, 6 interns.

Montreal General Hospital:
Montreal, Que.; 525 beds, appointed December, 46 interns.

Royal Victoria Hospital:
Montreal, Que.; 690 beds, 45 interns.

Kingston General Hospital:
Kingston, Ont.; 375 beds, appointed January, 4 interns.

Grace Hospital:
Toronto, Ont.; 121 beds, appointed December, 4 interns.

Toronto East General Hospital:
Toronto, Ont.; 135 beds, appointed June, 2 interns.

St. Joseph's Hospital:
Toronto, Ont.; 250 beds, appointed June, 6 interns.

St. Michael's Hospital:
Toronto, Ont.; 552 beds, appointed December and January, 22 interns.

Toronto General Hospital:
Toronto, Ont.; 1,050 beds, appointed January, 41 interns.

Hamilton General Hospital:
Hamilton, Ont.; 618 beds, appointed December, 21 interns.

Victoria General Hospital:
London, Ont.; 400 beds, appointed December, 12 interns.

Ottawa Civic Hospital:
Ottawa, Ont.; 540 beds, appointed prior to January, 18 interns.

Hospital for Sick Children:
Toronto, Ont.; 387 beds, appointed February, 15 interns.

Toronto Western Hospital:
Toronto, Ont.; 312 beds, appointed December, 15 interns.

Metropolitan General Hospital:
Walkerville, Ont.; 126 beds, appointed January, 2 interns.

Hotel Dieu of St. Joseph's Hospital:
Windsor, Ont.; 132 beds, appointed December or January, 2 interns.

Children's Hospital:
Winnipeg, Man.; 125 beds, appointed January, 6 interns.

Winnipeg General Hospital:
Winnipeg, Man.; 628 beds, appointed January, 27 interns.

St. Boniface Hospital:
St. Boniface, Man.; 435 beds, appointed October, 4 interns.

Regina General Hospital:
Regina, Sask.; 388 beds, appointed October, 12 interns.

Royal Alexandra Hospital:
Edmonton, Alta.; 360 beds, plus 100 isolation, appointed January, 6-8 interns.

University of Alberta Hospital:
Edmonton, Alta.; 376 beds, appointed May, 10 interns.

Vancouver General Hospital:
Vancouver, B.C.; 1,083 beds, 35 interns.

● One of a series of messages in the *Saturday Evening Post*, the *Literary Digest* and other magazines, setting forth some of the accomplishments of Medical Science in the diagnosis, treatment, and prevention of disease.

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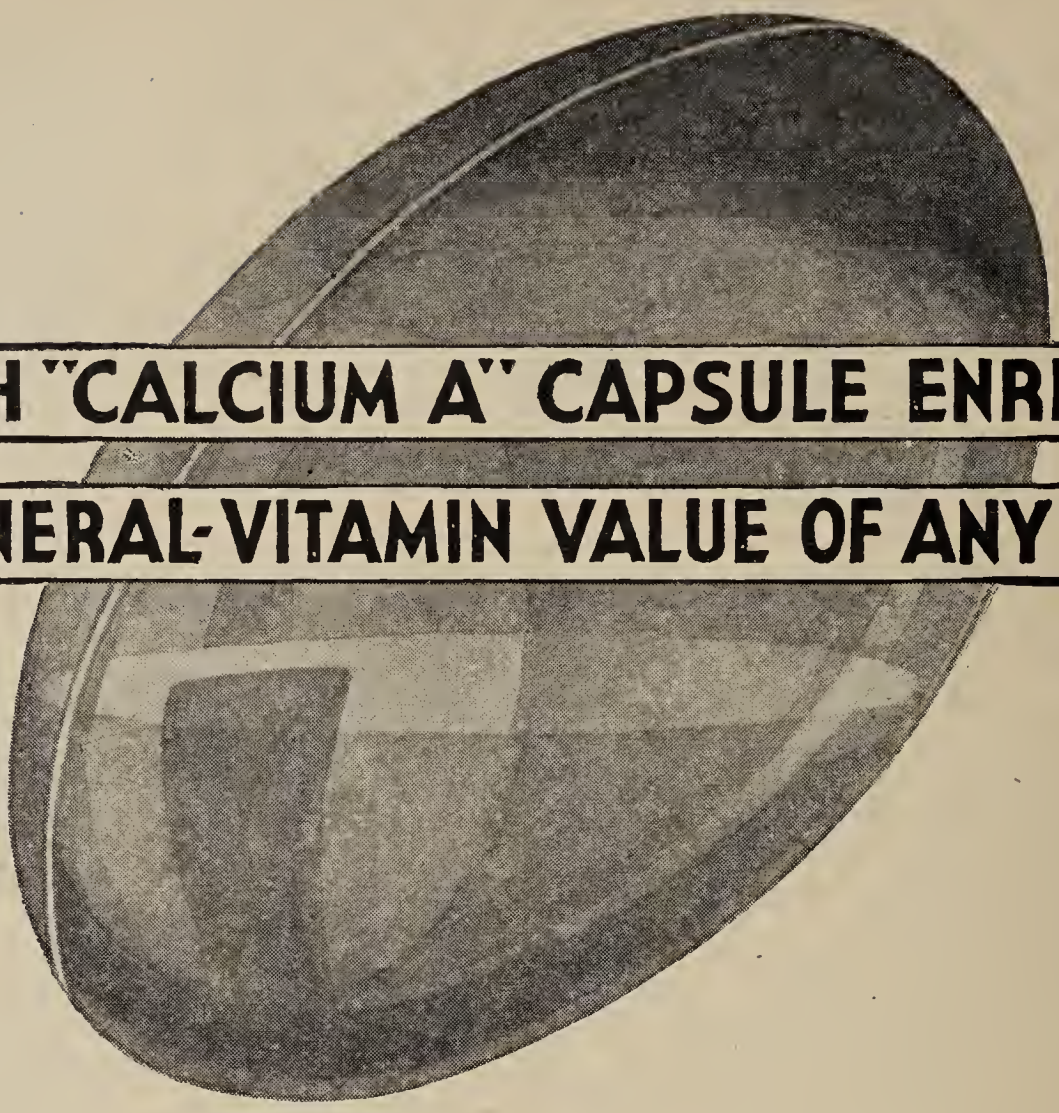

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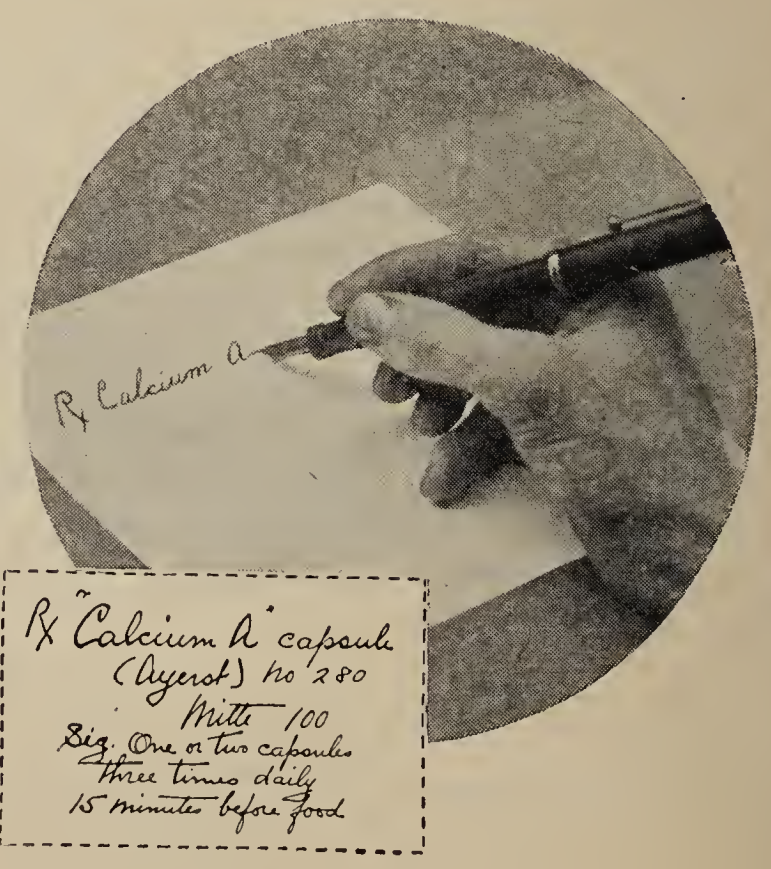

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